

# CleanAIR ASSURE™ DOC

*Reduces Particulate Matter, Carbon Monoxide and Hydrocarbon Emissions*

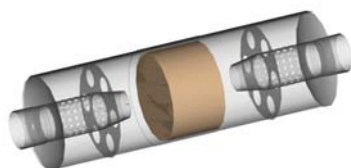
**Application: All Diesel Engines**

## General Information

The ASSURE™ DOC (diesel oxidation converter) for diesel engines is designed to reduce diesel particulate matter (PM) by 25% and carbon monoxide (CO) and hydrocarbon (HC) up to 90%. DOC units are designed for on-road and off-road vehicles and equipment such as trucks, buses, construction equipment, mining vehicles, and power generation equipment.



The high-performance, durable oxidation catalyst is supported on a ceramic honeycomb substrate and housed within a stainless steel canister. This proprietary oxidation catalyst technology is available in both standard converters and converter/muffler combination systems. In many diesel engine applications, the oxidation catalyst can be retrofitted as a direct muffler replacement. The ASSURE™ DOC is a flow-through device designed to operate on diesel fuel with a maximum of 500 ppm sulfur level.



## How It Works

The ASSURE™ DOC transforms pollutants into harmless gases through oxidizing, or burning, by combining them with free oxygen in the exhaust. Polluting emissions result from the incomplete combustion of fuel. Oxidation completes the combustion. In the case of diesel exhaust, CO, HC, and to a lesser degree PM, are oxidized into carbon dioxide and water vapor.

Diesel particulate matter is the most complex and troublesome diesel emission. PM includes both solid and liquid material. Although the chemical and physical compositions of the various particles differ, the basic fractions of PM are elemental carbon and heavy hydrocarbons. The ASSURE™ DOC reduces both the soluble organic fraction of PM, which is a liquid material consisting mostly of hydrocarbon, and the solid carbon portion by oxidizing them into carbon dioxide and water.



## Exhaust Temperature Requirements

Temperature of the exhaust is an important factor to activate the catalyst coating. Below 200°C little to no catalyst activity is

present. This means that emissions from the engine are not being reduced. As the exhaust temperature raises above 200°C the catalyst activity increases rapidly. For maximum PM reduction efficiency exhaust temperatures between 240°C and 360°C are optimum. The ASSURE™ DOC can withstand temperatures as high as 1000°C without damage. This is well above the operating range of diesel engines, which generally operate between 250°C and 350°C with some small high temperature excursions that reach as high as 500°C

## Heat Generated By The ASSURE™ DOC

In general, the ASSURE™ DOC does not increase the exhaust temperature. The unit is oxidizing the unburnt fuel in the exhaust. In a diesel engine the unburnt fuel in the exhaust is at a very low concentration. This low concentration combined with the high-flow rates, which carry the heat away, result in little or no temperature increase in overall exhaust temperature. However, because the converter adds mass to the exhaust system, the exhaust system around the converter will stay hotter longer. Caution must be taken when working around the converter for protection against burns.

## How Fuel Effects ASSURE™ DOC Performance

For the maximum performance in PM removal efficiency, it is recommended that the ASSURE™ DOC operate in conjunction with ultra low sulfur diesel fuel (ULSD), less than 50 ppm sulfur by weight. As the fuel sulfur content increases, the PM removal efficiency decreases. The maximum recommended fuel sulfur level to achieve significant PM reduction is 500 ppm.

High sulfur fuel, greater than 500 ppm sulfur, will not damage the catalyst coating or the ceramic DOC.

## Muffler Replacement

The ASSURE™ DOC is packaged inside a 304 stainless steel housing that replaces the muffler. The muffler can be clamped together to allow access to the filter unit for inspection if desired. Slip-on bolt flanges, or other types of connectors, can be designed on the unit. In general, filter muffler units are the same size or slightly larger than the regular muffler. This is necessary to keep engine backpressure at a low level. Every effort is made to design the ASSURE™ DOC to fit in the smallest possible package while maintaining engine performance.



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